



**STATE OF MONTANA  
MONTANA DEPARTMENT OF TRANSPORTATION  
JOB PROFILE**



Update



Formal Review

**Date Submitted** 10/22/13\_\_\_\_\_

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***SECTION I - Identification***

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**Working Title:** Bituminous Material Specialist

**Department:** Transportation

**Job Code Number:** 172516

**Division & Bureau:**  
Engineering/Materials

**Job Code Title:**  
CE Specialist

**Section & Unit:**  
Physical Test/Bituminous

**Pay Band:** 6

**Work Address:** 2701 Prospect Ave.  
Helena, MT. 59620

**Position Number:** 40085



FLSA Exempt  
Collar



FLSA Non-Exempt



Non-Union



MPEA



Blue

**Profile Completed By:** Ross Metcalfe, Devin Roberts

**Work Phone:** (406)444-7611

***Work Unit Mission Statement or Functional Description:***

The Helena Materials Bureau is part of the Engineering Division of the Department of Transportation. It is responsible for establishing all sampling, testing and product acceptance policies and procedures for materials used in State and Federal highway and bridge construction. The Materials Bureau tests all materials used in the construction of highways to ensure they meet contract specifications. A wide range of tests are performed on concrete, asphalt, soils, paint, water, fertilizer, wood, metal, and other products. The Materials Bureau monitors sampling and testing procedures throughout the year through the District lab and field inspections. District and Area labs monitor field personnel and the Materials Bureau offers technical assistance as needed. The Bureau is responsible for the control of all materials incorporated into a project through the preconstruction, construction, and maintenance phases. The Bureau is also responsible for all geotechnical and surfacing design, pavement management and core drilling work performed by the Department. The Materials Bureau is divided into the Geotechnical, Physical Testing, and Pavement Analysis sections.

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**Describe the Job's Overall Purpose:** This position conducts professional bituminous engineering research and analysis. The incumbent researches new technologies and determines appropriate department action and drafts specifications and guidelines to implement new bituminous technologies as needed to stay current of the latest technological advances. Evaluates project plans and provisions; establishes guidelines, procedures, and parameters for evaluation of current bituminous testing and mix design verification practices. Provides advanced technical assistance to a variety of individuals and consultants involved with ongoing road construction and maintenance projects; and performs other duties as assigned in support of the Department goals and Division objectives. The incumbent reports to the Testing Operations Engineer, Physical Test Engineer and Materials Engineer.

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<b>SECTION II - Major Duties or Responsibilities</b>	<b>% of Time</b>
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<b>A.) Bituminous Material and Plant Mix Research and Development</b>	<b>65%</b>
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This position is responsible for designing, developing, implementing and refining through continuous quality improvement mix design and acceptance processes for bituminous plant mix surfacing and chip for MDT. The position also relies on nationwide contacts through the Federal Highway Administration, other state contacts, and industry to develop and implement mix and chip design and acceptance processes or refinements. Processes designed and developed at the national level are further developed and refined to fit Montana's unique climate, geographical conditions and industry. Plans and implemented processes are continuously evaluated and modified as the industry develops keeping Montana current with national trends and the latest quality improvements.

- Contractor furnished mix designs are verified by the Bituminous Mix Design Unit and approved by the incumbent for contractor production under various highway projects. The position is responsible for designing, developing, implementing and maintaining a quality control/quality assurance program to ensure mix designs, developed as described above, are produced within reasonable conformance to the design. The position draws on the same national resources mentioned above providing input to design a QC/QA program for bituminous mix control. The position works in close cooperation with the Construction Bureau and the District offices in support of the QC/QA program.
- The position designs, develops, and implements testing programs that ensure all components and processes affecting bituminous mixes meet industry standards and quality criteria. Typical components are asphalt binder, asphalt modifiers, warm mix additives, lime as an anti-stripping agent and aggregate including both recycled asphalt pavement and virgin aggregate. The quality testing of these materials compliments the mix design process.
- The mix design, materials control, and QA/QC process is accomplished by laboratories working in coordination with this position (described below) and with close cooperation from project crews and district laboratories managed by others at the district level. Once the protocols and procedures are designed and implemented, routine assignments, reviews, recommendations and decisions are performed by indirectly subordinate supervisors.

- This position is responsible for resolving complex issues evolving from the bituminous mix process. The materials used in manufacturing bituminous mixes are naturally occurring materials, for example aggregates and asphalt, and as such are non-homogeneous and behave inconsistently. Frequently (10-20 % of the time) mix designs are difficult to produce or do not behave as expected in the production and placement process. Typically, test results and observed behavior are inconsistent with each other or ambiguous and the Bituminous Specialist conduct an investigation to analyze anomalies. In doing so, the position must rely on knowledge gained in soil mechanics, mechanics of materials, chemistry, physics, mathematics including statistical analysis in recommending an appropriate course of action based on the findings.
- Evaluates and analyzes test results, completed pavements and other sources of information in an attempt to identify trends or areas to improve practices or improve quality relative to bituminous mixes or the component ingredients.
- This position will conduct research on new trends such as the use of recycled materials in bituminous pavements. The latest trends show significant increases in the use of recycled materials nationally. Implementation of a bituminous recycling program in a rural state like Montana requires resolution of logistic hurdles that exist in maintaining quality materials, safety and convenience to the traveling public while providing a cost effective bituminous program. This position will be tasked with research and analyzing the issues and developing specifications to ensure a cost-effective quality bituminous product is achieved that balances the desire to maximize the amount of recycled material that can be reused while providing convenience and safety for the traveling public.
- Oversees and evaluates material testing, certification, documenting to ensure accuracy, completeness and the level of compliance with contract plans, specifications and quality assurance measures.
- Coordinates and oversees administration of MDT Ride Specification. This involves researching current technologies, coordinating profiler equipment and operator training, and identifying and implementing program, test method, or specification revisions.
- Coordinates with the construction materials reviewer, district lab personnel, materials engineers and design personnel to conduct investigations of actual or potential construction materials deficiencies during bituminous surfacing phases as necessary to rectify deficiencies.

#### **B.) Asphalt Properties & Bituminous Mix Design Testing Personnel Coordination 20%**

Although this position does not directly supervise staff in the asphalt properties lab the materials testing trends are vitally important to the overall results of the bituminous materials program. For this reason, close coordination between the incumbent and the supervisor and testing personnel in the asphalt properties lab is critical.

- The primary function of the Asphalt Properties Lab is to test various forms of asphalt cement for contract specifications. Asphalt products come in various forms and grades such as emulsions, cutbacks, pen graded, AC graded, AR graded or PG graded. The incumbent will be tasked with researching and implementing new technology and testing

as appropriate. For instance much of the industry is moving into the Multiple Stress Creep Recovery (MSCR) test that more accurately indicates the rutting performance of asphalt binders. The incumbent will be a key MDT player conducting research, developing specifications, and test methods and procedures for implementing MSCR testing.

**C.) Represents MDT on Various Regional and National Committees**

**5%**

Serves on a variety of materials committees directly related to stay abreast of the latest research and technologies emerging relevant to bituminous materials. Provides feedback to MDT's experiences involving new technologies and communicates MDT's concerns with emerging technologies. Fosters effective communications and establishes critical contacts with leaders in developing technologies.

- Represents MDT on the binder subcommittee of the Rocky Mountain Asphalt User/Producer Group. This committee develops and defines material specifications and test procedures that will be used by state DOT's and industry throughout the Rocky Mountain region.
- Coordinates MDT's involvement with the Western Cooperative Test Group. Assures round robin test data is submitted accurately and on time. Works with other group members to analyze round robin test data and identify precision statements for asphalt related testing procedures.

**D.) Other duties as assigned**

**10%**

Performs a variety of other engineering activities as assigned by the Testing Operations Engineer, Testing Engineer, or Materials Engineer in support of the department mission and division objectives. This includes exchanging information with contractors, agency staff, and the public; providing training, education, and professional and technical assistance; directing special projects, planning, scheduling and directing meetings, committees, panels; and attending on going education and training as directed.

- Directs, plans, and schedules various meetings, technical panels, hiring processes, and other committees to help reach the Department's goals and objectives. Serves on team panels such as post construction reviews and project value analysis committees. Research value engineering proposals submitted by contractors. Develops reports to summarize findings and distribute lessons learned to applicable Department team members to maximize quality and cost effectiveness. Explore innovative technologies to increase efficiencies and to maximize productivity and strengthen credibility.

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***The following duties and/or specific tasks listed under section II above are considered "essential functions" because they require specialized expertise and skill and are the primary reasons the job exists (they must be performed by this position with or without accommodations):***

Duties A - Bituminous Material and Plant Mix Research and Development ; B - Asphalt Properties & Bituminous Mix Design Testing Personnel Coordination; C - Represents MDT on Various Regional and National Committees are considered essential functions because they require specialized expertise and are the reasons the job exists.

**The following mental and physical demands are associated with these essential functions:**

**PHYSICAL**

- This position is required to carry up to 70 lbs.
- Carry light items (papers, books, small parts)
- Remaining seated for extended periods of time, with occasional walking; standing; bending
- Travel within the state to project location, and out of state travel by airline to national conferences and meetings.
- Operating a personal computer
- Communicate in writing, in person, and over the phone

**MENTAL**

- Deal with the public on a regular basis
- Ability to multi-task
- Demands for accuracy in all aspects of work
- Ability to meet inflexible deadlines
- Decision making that affects public health and safety
- Computing arithmetic operations
- Comparing data
- Compiling information
- Analyzing
- Coordinating
- Synthesizing
- Negotiating
- Instructing

Does this position supervise others? ☐ Yes ☒ No

***Attach an Organizational Chart.***

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***SECTION III - Minimum Qualifications - List minimum requirements for the first day of work.***

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**Critical knowledge and skills required for this position:**

**KNOWLEDGE:**

This position requires extensive knowledge of materials inspection, sampling, testing, and analysis protocols and procedures; associated mathematical and scientific principles; advanced research methods and techniques; and adult education and training principles. This position also requires knowledge of state, federal, AASHTO, WAQTC, and ASTM testing standards, procedures, and specifications; FHWA specifications and procedures; methods and techniques of highway construction; and safety practices and procedures. A progressively responsible knowledge of specialized sampling and testing equipment, software, and other technologies is also required.

Requires advanced application of civil engineering principles including mathematics and physical sciences especially in materials engineering and requires extensive experience in bituminous mixes, both the design and construction practices regarding placing and control of asphalt pavements.

Requires considerable knowledge of research methods and techniques, design and highway construction processes; field applications of highway engineering and construction, and construction methods and practices.

**SKILLS:**

This position requires extensive skills in the translating of technical information to varied audiences; training others through instruction, demonstration, and constructive feedback; application of laboratory instruments and the operation of specialized equipment; developing, testing, and implementing new methods, standards, procedures; and technologies; ensuring compliance with state and federal requirements; managing multiple projects simultaneously; and written and verbal communication skills. Requires advanced skill in reading and interpreting complex plans and contract documents, interpreting and writing specifications as well as the ability to use logical and understandable approaches to analyzing issues affecting bituminous features of highway construction and maintenance projects.

**Behaviors required to perform these duties:** See MDT Core Behaviors

**Education:**

Check the one box indicating minimum education requirements for this position for a new employee the first day of work:

- |   |  |
|---|--|
| <input type="checkbox"/> No education required                | <input type="checkbox"/> Related AAS/2-years college/vocational training |
| <input type="checkbox"/> High school diploma or equivalent    | <input checked="" type="checkbox"/> Related Bachelor's Degree            |
| <input type="checkbox"/> 1-year related college/voc. training | <input type="checkbox"/> Related Master's degree                         |

**Please specify the acceptable fields of study:**

Acceptable: Engineering or Construction Technology

**Other education, training, certification, or licensing required:**

Required: Fundamentals of Engineering certificate;

Preferred: Registration as a Professional Engineer in Montana.

**Experience:**

Check the one box indicating minimum work-related experience requirements for this position for a new employee the first day of work:

- |   |   |
|---|---|
| <input type="checkbox"/> No prior experience required | <input type="checkbox"/> 3 years            |
| <input type="checkbox"/> 1 year                       | <input checked="" type="checkbox"/> 4 years |
| <input type="checkbox"/> 2 years                      | <input type="checkbox"/> 5 or more years    |

**Other specific experience:**

The position requires four (4) years of progressively responsible experience in materials lab testing, highway design, or roadway construction with at least two years involving testing, mix design, or construction of plant mix or bituminous materials.

**Alternative Qualifications:**

This agency will accept alternative methods of obtaining necessary qualifications.

☒ Yes ☐ No

**Alternative qualifications include:**

A master's degree may be considered as a partial substitute for work experience on a case-by-case basis.

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***SECTION IV – Other Important Job Information***

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None specified

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**SECTION V – Signatures**

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Signature indicates this statement is accurate and complete.

***Employee:***

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Immediate Supervisor:***

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Bureau Chief:***

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Division/District Administrator:***

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Department Designee:***

Brent Rabe/Designee

Human Resources Administrator  
Human Resources Division

Signature: \_\_\_\_\_ Date: \_\_\_\_\_